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10/523,127

01/21/2005

Wei-Kan Chu

123019-1051 (UHID 2228)

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10/10/2006

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EXAMINER

WILCZEWSKI, MARY A

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 10/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/523,127

Applicant(s)

CHU ET AL.

Examiner

M. Wilczewski

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites the limitation "the first conductivity type" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 8, 10, 11, and 12 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Lee et al, US Patent 6,518,136.

Lee et al. disclose a method of forming a microelectronic structure on a semiconductor material having a silicon surface on a substrate comprising the steps of :

- a. implanting arsenic ions into a surface layer (Fig. 3 and col. 3, lines 15-20);
- b. subjecting the semiconductor material 12 to a first annealing process (col. 3, lines 20-25); and
- c. subjecting the semiconductor material 12 to a second annealing process (col. 3, lines 61-65).

Lee et al. disclose a step of implanting boron (second dopant ions of a second conductivity type) at an acceleration energy of 3 to 10 Kev with a dosage from about $5 \times 10^{13}/\text{cm}^2$ to $5 \times 10^{14}/\text{cm}^2$ (col. 3, line 66, bridging col. 4 to line 4). Since the acceleration energy and dosage used in the method of Lee et al. fall within the claimed ranges, the concentration of the implanted regions of Lee et al. will inherently lie within the range of concentrations recited in claim 11.

Claims 13-15 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Eaglesham et al., US Patent 5,731,626.

Eaglesham et al. disclose a method of forming a microelectronic structure on a semiconductor material by MBE comprising the steps of:

- a. exposing, in a vacuum chamber, a single crystal semiconductor body to a flux of boron and carbon with the body maintained at a temperature of 600°C (col 5, lines 10-24);
- b. depositing a single crystal epitaxial layer with dopant atoms that are electrically active (col. 5, lines 24-41); and
- c. subjecting the semiconductor material to a post-growth annealing process in a vacuum (col. 5, lines 45-47).

Note in col. 5, line 64, bridging col. 6 to line 2, Eaglesham discloses that there is minimal diffusion of boron during the annealing process.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al., US Patent 6,518,136 in view of Lee, US Patent 6,037,640.

Lee et al. is applied as above. Although Lee et al. disclose a high-energy and low-energy implantation step, Lee et al. lack anticipation of the energies recited in claim 3. However, these are conventional energies used in high- and low-energy implantation steps used in the fabrication of MOSFETs having shallow source/drain junctions, see col. 6, lines 10-14 and lines 48-50. In addition, Lee discloses the particulars of the annealing process; see col. 7, lines 45-67. It would have been obvious to one skilled in the art to implement the teachings of Lee in the known method of Lee et al. in order to obtain ultra-shallow semiconductor junctions, see the abstract of Lee.

Drawings

The drawings filed on January 21, 2005, are acceptable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Wilczewski whose telephone number is (571) 272-1849. The examiner can normally be reached on Monday - Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



M. Wilczewski
Primary Examiner
Tech Center 2800